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This document focuses on five major themes: (1) What's Right and What's Wrong with Vocational Education, (2) Technology for Elementary School Children, (3) Setting Performance Objectives for Learning, (4) A Practical Program for "Real" Learning, and (5) Vocational Guidance: An Unfulfilled Challenge. It is recommended that vocational education needs to renew itself according to the following priorities: (1) implementing the chief recommendations of the 1963 panel of consultants on vocational education, (2) presenting a realistic picture of the world of work in elementary schools, (3) shifting an emphasis from "teaching," in which a dominant adult makes a series of external demands upon children for externally desired responses, to "learning," in which a student interacts directly and intimately with things and people and learns to generalize from these experiences, and (4) developing a whole new curriculum which emphasizes attainment through performance objectives. (CH)

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EDUCATION AND THE REAL WORLD OF JOBS.

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WHAT'S RIGHT AND WHAT'S WRONG WITH VOCATIONAL EDUCATION?

The central issue in the design of education is the student and his learning, not the teacher and his teaching.

Vocational education is outside, almost isolated from, the mainstream of American schooling. This fact works to the detriment of students enrolled in vocational education as well as those in the college-oriented and "general course" mainstream.

As outsiders, vocational education students tend to reject study of "mainstream" subject material, chiefly language and computation skills, which often are as necessary to vocational success as to college acceptance. Also, these students are often rejected by teachers of academic subjects, reinforcing the tension between "voc-ed" students and academic learning. The inferior status of the vocational education student is formalized at the end of his schooling when he earns a diploma generally regarded as third class. (First-class status, of course, belongs to the academic diploma of the college-bound student. Secondary standing goes to graduates of a "general" course who, although not qualifying for the better colleges, at least have not been tainted by an

emphasis on "practical work.")

Vocational students, of course, are required to complete courses in English, mathematics, science, and social studies which are generally planned by college-minded teachers with college-bound students in mind. While the subject matter is often highly relevant to the study of trade and industrial skills, the instruction of it is artificially fragmented into subject disciplines, thus obscuring its relevance. There is little effort to relate subject matter to day-by-day applications in vocational workshops. The enormous creative effort required to make these studies relevant is not likely to be taken on his own by the student, whose choice of a workshop education is itself a signal that the student is not highly inclined toward abstract relationships.

As the vocational education student is thus shortchanged, so are his higher-status schoolmates. Equipped as college-minded youngsters may be in the peculiar art of mastering symbols and abstractions, their rigid program requirements forbid them, even if they want to, from engaging deeply in the real-life activities of operating machines, drawing practical plans, working with their hands, making things.

Thus, the symbols they study (whether in literature or mathematical formulae) move increasingly away from the real things they symbolize. These students, too, are headed for vocations, but one would hardly know it from their studies.

It is no surprise, therefore, that students who are most apt and skilled at the work of study are often most puzzled about their future places in the world of work.

Clearly, a new definition of vocational education must be constructed. If all students, one way or another, are headed for a world of work, the new concept of vocational education must serve them all. If mathematics is as necessary to the machine-shop operator as it is to the nuclear engineer and economic analyst, ways of teaching it must be found to serve them all. Similarly, for English and the sciences and, yes, social studies.

These observations, hardly new, lead inevitably to a need for wider consideration of <u>comprehensive</u> schooling, in which doing of the practical and learning of the abstract intertwine and serve each other. They also lead to examining the merits of enabling students, whether college-bound or job-bound, to mix more freely their choice of academic courses now considered academic with those now considered vocational ones. They lead to the need for revising lesson plans to make now-discrete subjects (math, science, English, etc.) more related and interdependent on a day-to-day basis, a revision known as the "organic curriculum." Finally, they lead to consideration of granting a single class of diploma to all high-school graduates.

Other than some preliminary solutions, answers do not appear to lie chiefly in administrative change of vocational education or of the whole high school. Changes in vocational education -- for all -- must be sought in further study of learning -- individual needs for and individual styles of learning; appropriate ages for certain kinds of learning; new kinds of tools for learning; more precise specifications of goals for learning. Such considerations have been largely lacking in much of the rising concern for the directions of vocational education.

Criticism of vocational education has recently risen. The new popularity of denouncing vocational education is already obscuring what may truly be wrong with it and what may be done to correct it.

One conclusion to which many are already persuaded is that the quality of existing vocational education is generally poor. That is not true. A massive study recently completed by Jacob J. Kaufman and others ("The Role of the Secondary Schools in the Preparation of Youth for Employment," Institute for Research on Human Resources, Pennsylvania State University, February 1967), which is highly critical of many shortcomings of vocational education, concluded: "Generally speaking, the trade and industrial programs were good. When all available data were analyzed, the strengths outnumbered the weaknesses, regardless of community size....The instructional staffs were generally good as were the

instructional programs, physical facilities, and hardware."

A more recent report of the Advisory Council on Vocational Education, also severely critical, gave support to the same general conclusion.

Another increasingly popular belief is that vocational education is a "dumping ground" for slow, unambitious or undisciplined students. This, too, appears untrue. The Kaufman study shows that fewer than five percent of vocational education students reported "outside pressure" from school administrators or parents as the reason for their choice. More than two-thirds of vocational graduates -- those presumably using their skills in the marketplace -- reported that they would advise other young people like themselves to choose a vocational curriculum. These findings, writes Kaufman, "do not support the often-heard charge that vocational education at the secondary-school level provides a 'dumping ground' for less able students." But he adds, "Neither do these findings substantiate the charge of administrative direction of selected students into the vocational curriculum."

Still another frequent charge (growing as popular as it is vague) is that vocational education administrators are too ineffective, lowly placed, or disrespected to persuade top-level administrators about the need for change. While this may sometimes be true, it appears to miss the point, which is that neither the top-level administrators nor

vocational education administrators have widely re-examined the process of learning for all children and how that process may best contribute to preparation for the real world of decisions and real jobs and professions.

The great failures of vocational education are that its definition is too limited, its point of entry too late and its standard of admission too high.

Vocational education is usually regarded as an isolated grouping of specific courses to teach specific skills, chiefly trade and industrial. These may include auto repair, machine-shop practice, welding, electrical work, electronic assembly and maintenance, data processing, refrigeration and farm technology; courses chiefly for women include office skills, beauty culture, hospital technical work and home economics.

What should vocational education be? The Advisory Council on Vocational Education, in its 1968 report to the Secretary of Health, Education and Welfare, declares, "Any occupation which contributes to the good of society is a fit subject for vocational education." Marvin Feldman of the Ford Foundation says, "My thesis is that vocational education is not a separate discipline and cannot be treated in the same way we approach mathematics, English, or the physical sciences. It is, rather, an approach to the disciplines and learning process which, properly used, could reconstruct the American educational system for greater relevance or general education and a renascence of

liberal-arts studies....A good first step is to redefine vocational education at least in part as that aspect of an educational experience which helps a person discover, define, and refine his talents, and to use them in working toward a career. This definition sees vocational education embracing, but not confined to, development of manual skills; it sees such skills used not merely to prepare for tasks, but as alternatives or supplements to verbal skills in the entire learning process. The definition requires, regardless of the educational level, an opportunity to learn and demonstrate learning in non-verbal ways, learning the relation between the educational program and the purpose and nature of work, developing a faculty for continuing growth, and the ability to work with, not merely alongside, others."

Before making a closer examination of ways to make vocational education more successful, it is worthwhile to look more deeply into the nature of its shortcomings. As David S. Bushnell and Robert M. Morgan of the U. S. Office of Education Bureau of Research pointed out in 1966:

"It is true that we are educating more of our young people than any other nation--but for what?

"Let's take a look at the 1944 baby crop. This is the group that made up the high-school class of 1962 and last year's class of college graduates. Nineteen percent left school before the eleventh grade; 30 percent didn't finish high school. Thirty-five percent entered college but only 20 percent graduated with a

bachelor's degree. Thus, eight out of ten of these students were candidates for jobs requiring less than a college degree.

"Yet only one of these eight received any kind of occupational training in the public schools!"

Writing in the Southern Education Report, Clayton Braddock placed this argument in a new perspective:

"If eight out of every ten fighting men who poured on to the Normandy beachheads in World War II had spent their training time studying European history and culture instead of learning how to fire the M-1 rifle, the public and congressional clamor would have been deafening. A similar -- but very real -- situation in American education today is causing little widespread concern.

"Of every ten children in grade school in the United States today, four will continue their education beyond high school. Only two of these -- a scant 20 percent of the American school population -- will go on to complete four years of college. Yet about 75 percent of what the nation's youth study all through school is aimed, in effect, at preparation for college."

Even the preparation of the college-bound youngster is falsely glamorized. We assume that such a student is somehow automatically set up for life. It is true that over the long run he is not likely to face a severe problem of self-support. Almost any youngster with the literacy skill to enter a post-secondary school will eventually find his way to a job, probably a fairly good one, whether he finishes college or not. But he may travel a winding, rocky,

painfully soul-searching road on the way. As any parent knows, many a youngster enters -- even completes -- college without having the vaguest notion of how he will work his way through life. Too often, school did too little to prepare him for elementary decisions for directing his individual inclinations toward a career. The longer a student stays in school, the more likely he will find -- through sheer age and life experience -- personal ways of overcoming this deficiency. On the other hand, the lower a student stands on the academic scale, the more likely he will suffer from the neglect of his individual development. As Kaufman et al observed:

"Probably the most serious problem facing education in general today is to provide an educational system which acknowledges the existence of individual differences among our youth and which creates adequate facilities and programs to meet these differences ....A very large proportion of students do not have the intellectual prerequisites, aptitudes or interests for an academic education. Nor do vocational education programs -- because of requirements -- meet the needs of these students. Therefore, a large number of students find themselves enrolled in the 'general curriculum.' In most instances, this is not a curriculum but, for boys especially, simply a combination of low-level academic and industrial arts programs. Probably one-third to one-half of the students in secondary schools fall into this category.

"Most educators would admit that even if present vocational programs were expanded to the fullest, there would remain a sizable percentage of young people who would still not be served. Included among these young people would be some for whom present programs have no inherent interest, others who cannot decide what type of program they wish to take, still others who do not wish to commit themselves to a certain type of training, some who see little opportunity for themselves even after completing these programs, and many others who are excluded or who exclude themselves for a variety of other reasons. Most of these students either leave school before graduation or continue on in the general curriculum."

It clearly follows that the great academic "dumping ground" is not vocational education but the general curriculum.

The sorely-needed shift in the concept of vocational education began -- at least in the intent of Congress -- with the passage of the Vocational Education Act of 1963. It represented the first fundamental change in attitude toward vocational education since the Smith-Hughes Act of 1917. It vastly broadened and loosened the boundaries of defining vocational education.

The Smith-Hughes Act grew out of demands of an economy just reaching industrial maturity. Along with subsidizing training for farm skills, it aimed at urbanizing and training a relatively small cadre of skilled workers to lead a factory system of large numbers of unskilled workers. Its primary concern was the labor market, not the laboring man.

As America moved gradually, during half a century, from a factory system to one of advanced technology and widespread personal services, a vast change took place not only in the needs of the labor market but in the lives of people. Families moved in great waves from farm to city. The extended family unit of the farm was compressed in the city to the primary unit of husband, wife and children. Introduction of children to the world of work was no longer a natural, gradual process of boys working at their fathers' sides, daughters by their mothers. Work became less generalized, more specialized. The possibility of a child becoming acquainted with new specialized industrial tasks became increasingly difficult.

On the farm, entrance into the working life had been gradual. In industry, it became sudden. A student toting schoolbooks yesterday is suddenly today a worker carrying tools; yesterday a dependent, adult-dominated child, today, a self-supporting, decision-making man. In the past this change took place imperceptibly; today change in the life of the modern youngster is violent, without preparation, often disorienting.

Meanwhile a parallel change, equally profound in its effect on the young, has emerged. The idea of universal, protracted schooling -- in reading, writing and mathematics as well as history and the sciences -- has rapidly spread. With this spread came a dramatic rise in the professionalization of teachers. As schooling became a specialized world of its own, simultaneous with the

increased specialization of industrial work, schoolwork began losing its integral connection with the working world of adults. Work for its own sake, of which children had had perhaps too much, became replaced by study of words for their own sake. Children who no longer milked cows now struggled over reading about three little pigs, a new, abstract task at which some failed. The geometry of plowing a field was replaced by pencil-and-paper theorems, which some never quite mastered. The storekeeper's son, who once totaled grocery lists and delivered packages, today lives in a suburb; he seldom sees his father's store and is lucky if Dad helps him with his homework in new math which neither may fully understand.

Abstract learning, instead of being drawn from concrete experience, has virtually replaced it. Children of both inner city and suburb , both headed for symbol-manipulating adult worlds may be equally deprived of the early sensory, concrete experiences that explain the symbols they are expected to learn. Adults who understand the connection between pencil marking and manual work impose one to the exclusion of the other, often failing to convey the connection to the young. The world of work and the world of words have become disengaged.

What has really happened is a shift from "learning by doing" to "learning by preparation." The more teachers instruct, the more children wonder, "preparation for what?" This unconscious, but not unsophisticated question, underlies the alienation of the poverty-ghetto youngster who seldom sees his father go to work, the suburban

"hippie" who has little conception of what his father does when he goes, and the perpetual student who piles post-graduate seminar upon seminar, unable to commit himself to beginning the mysteries of a career.

The Vocational Education Act of 1963 enables at least a beginning to a reexamination of the role of school as preparation for lives of work by substantially increasing funds for charting new directions. The real impact of this Act in improving vistas for students will be determined by what local educators do.

One noteworthy effort by local educators is the establishment of a national "network" of experiment-minded schools called ES-70 (Educational System for the 1970's). The project has been stimulated and financed by the Division of Adult and Vocational Research of the U. S. Office of Education. The local experiments are not necessarily directed at vocational education in the old sense, but at the larger aim of making education more relevant to the realities of a student's future. They involve students at all levels, kindergarten through 12th grade; reducing the artificial separation of subject material (English, math, science, etc.) and weaving it all into an "organic curriculum" reflecting real-world uses of knowledge; emphasis on learning by performance of practical tasks with manipulative and technological learning aids; assignment of work and testing in accordance with performance objectives, with considerable emphasis on self-directed study; reassessing and revising the roles of teachers, technology and architecture for enhancing maximal learning.

Harmonious with the aims of ES-70's school-wide experiments and research, Marvin Feldman outlines the elements of an "organic curriculum" for improving the vocational aspects of education:

"An effective occupational and vocational education program would begin in the elementary school, where youngsters would be introduced to the concept of choice between achievement through verbal or abstract performance, and achievement through manipulation and demonstration with real objects. Both processes would be designed to achieve the same learning goals. Each unit of work in the language arts, for example, would begin with the self-directed experience in building something or in a simulated work setting, and youngsters at varying levels of readiness would be provided with achievement goals to match. Eventually all would have to verbalize or demonstrate what they have learned -- but in different ways, at different times, each in accord with his own abilities and talent.

"Furthermore, we can no longer pretend that it is possible to do an effective mass educational job in a single classroom, or from the viewpoint of a number of unrelated disciplines. Education is really not a series of separate little containers of knowledge, though we tend to act as if it were and thereby to establish further barriers to effective learning. A vocational objective, however, could be the vehicle to bring the containers together, to allow each student to see education in an action setting and to provide more flexible paths toward its attainment.

"A prominent feature of elementary education would be continuing discussion of how man uses work to support himself, how the major types of occupation use knowledge, and of the fact that not all productivity is verbal. No effort should be spared to develop appreciation and respect for the varying talent of the individual, on the part of the pupil as well as of the school system. A major objective of elementary education should be to seek out the talent in each and show its relationship to the world of work.

"In the junior- and comprehensive high-school teaching program, academic teachers would be teamed with vocational teachers representing laboratory, shop, and similar settings. They would arrange their teaching in a coordinated curriculum, each to reinforce the other and the subject matter.

"The comprehensive program also would provide a new kind of industrial-arts course to be taken by all male students in junior high school. This would provide the basic manipulative skills needed in the high-school sequence, and would provide additional training in the use of demonstration as an alternative to verbal performance."

In the course of preparing this booklet, investigators examined existing research and significant recommendations; they also visited a number of innovative projects in a search for promising new directions. From these projects, three have been selected for detailed case description here as representative of major new thrusts

in improving and broadening vocational education. One is a project involving small children (K-6) and the broad educational benefits acquired through intimate involvement with tools and the man-made environment of construction, printing, electricity, etc. This project also involves a major teacher-training component. Another case study is that of middle-school students in a learning environment of self-directed study guided by performance objectives. A third is an example of high-school students, who might otherwise become dropouts, fruitfully involved in learning a useful occupation not requiring great technical skill or academic aptitude; mass food preparation and managerial services in the hospitality industry.

Over and above the preparation of these specific case studies, the investigators preparing this booklet have arrived at a conviction that the field of vocational education needs to renew itself according to the following priorities:

1. Implementing the chief recommendations of the Panel of Consultants on Vocational Education appointed by President John F. Kennedy in January 1961, which led to the Act of 1963. These recommendations were forcefully endorsed by the Advisory Council on Vocational Education in its 1968 Report: "Of all the Panel's recommendations, two conceptual changes were most important. The first was the concept that vocational education must be redirected from training in a few selected occupational categories to preparing all groups of the community for their place in the world of work, regardless of occupation. Secondly, the Panel insisted that vocational education must become responsive to the urgent needs of

persons with special difficulties preventing them from succeeding in a regular vocational program." Regarding the second concept, the 1963 law permits use of federal funds for the first time for "persons who have academic, socio-economic or other handicaps that prevent them from succeeding in the regular vocational education program."

2. Also as recommended by the Advisory Council: "Occupational preparation should begin in the elementary schools with a realistic picture of the world of work. Its fundamental purposes should be to familiarize the student with his world and to provide him with the intellectual tools and rational habits of thought to play a satisfying role in it....In junior high school, economic orientation and occupational preparation should reach a more sophisticated stage with study by all students of the economic and industrial system by which goods and services are produced and distributed. The objective should be exposure to the full range of occupational choices which will be available at a later point and full knowledge of the relative advantages and the requirements of each....Occupational preparation should become more specific in the high school, though preparation should not be limited to a specific occupation."

3. Shifting in emphasis from "teaching," in which a dominant adult makes a "series of external demands upon children for externally desired responses"*, to learning, in which a student interacts directly

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* "On the Role of the Teacher," Educational Policies Commission, National Education Association, 1967. This short booklet is a useful amplification of the distinction made here between teaching and learning.

and intimately with things and people and learns to generalize -- create his own knowledge -- from these experiences. What a child who is constantly "taught" may most effectively learn are ways of resisting, escaping, rebelling against or faking his way through the absorption of a teacher's external demands. This is especially true of the student who does not feel in tune with the college-dominated aura of most public schools. On the other hand, the student who is skillfully and respectfully guided by a teacher into experiencing his own senses, satisfaction of making things with his own hands and mind, risking his own initiative and learning from its results, feeling an increasing control over his own education and growth, and, perhaps most of all, knowing the relationship between the physical world about him and the abstract symbols of knowledge -- that student hardly has reason ever to tune out, "turn off" and drop out.

4. Development of whole new curriculum approaches that enable a student to transform his personal experience into useful knowledge, with an emphasis on measuring his progress through the attainment of performance objectives. This would shift the measurement of educational effectiveness from "input" to "output." Recent experience, to be detailed in the ensuing pages, indicates that most of today's teachers, bound by old classroom traditions, are not the most effective creators of such a change in curriculum. A new specialized skill of curriculum development based on performance objectives must be

encouraged, supported and expedited.

5. The field of guidance and counseling must undergo great change to help youngsters understand the diversity of occupations for which they are ultimately headed and to help them make educational decisions that are more appropriate to the real lives for which they are preparing.

TECHNOLOGY FOR ELEMENTARY SCHOOL CHILDREN

Ordinarily, a booklet reporting new trends in vocational education would begin with new developments in high schools, where skill training traditionally has been centered. But if the high-school problem truly begins in early learning, why not turn the subject around? Why not ask what might happen in the earliest days of school which might later enable a truly improved system of vocational education in high school?

"Occupational training," declared the Advisory Council on Vocational Education, "should begin in the elementary schools with a realistic picture of the world of work." A growing number of educators endorse this view, some suggesting that the proper place to begin may be kindergarten.

Their reasons transcend the limited objectives of training children for specific occupations. They are addressing basic issues of public education: how children learn, what different sorts of individuals are most ready and able to learn, the realities of a world shaped by man-made technology in which children will live their lives.

Hardly anyone would disagree that a major job of a school is to help children understand their environment and live in it effectively. But what are the main elements of that environment?

"I've always felt," says Dr. Robert M. Worthington, New Jersey's Assistant Commissioner of Education in charge of vocational instruction,

"that most teachers only seem interested in telling children about their natural environment -- the birds, the bees, the flowers and so forth. If airplanes go overhead, these teachers ignore them. They don t have much interest in the man-made environment. As I see it, if you wait until boys and girls are in junior high to start understanding something of the world of work, it's often too late. What we're trying to do is find a total program of vocational education. It's part of a total program of education, but its implications are vocational. We're trying to develop a program that will start early, that would go all the way through the adult life of an individual. Hopefully, at the early levels, children would begin to develop an interest in the world of work, an understanding about it, so that when they move on up through school, they know what we're talking about. When they're asked in the seventh grade to start electing things, they'll have some idea of what they're selecting -- how it will affect their future. I know, you can find isolated examples of teachers who have done this for years. And I'm sure a lot of people say, 'That's nothing new. That's what Dewey was talking about.' But the fact remains that schools as a whole have been doing very little about it."

About three years ago Dr. Worthington's division in New Jersey introduced a program called "Technology for Children" as part of regular academic work for children in kindergarten to Grade 6. The experiment has spread thus far through 38 classrooms in 21 elementary schools, involving 1,100 students.

The joining of verbal with manipulative learning, as described in the preceding chapter by Marvin Feldman, is clearly at the root of practice in a fifth-grade Technology for Children class at Cooper's Poynt School, Camden, New Jersey.

While T for C classes represent children of many socio-economic settings -- affluent and poor, rural, urban and suburban -- Cooper's Poynt School is located at the core of Camden's inner city where poverty is widespread, where population of Negroes and Puerto Ricans is dominant, where academic achievement in conventional terms is most difficult to attain.

All through the spring of 1968, these fifth graders, led by their teacher Mrs. Louvenia Powell, were building a log cabin in their classroom as a concrete extension of their academic studies in early America. One day during that spring, a visitor walked in while Mrs. Powell was away in the school library with half of her class. The half remaining in the classroom unsupervised paid no attention to the visitor. They were neither distracted from their work nor in apparent need of supervision. Their work was totally involving.

Some of these children were four years behind in grade. Instead of appearing the socially-anguished, incorrigible cutups one might expect them to be, these older children were the foremen of the others, answering their questions, giving directions, keeping the remarkable job organized. No one was idle. Conversation was minimal. The children were engrossed in applying rulers to logs, making pencil marks, hammering at chisels to dig carefully-measured notches, banging at spikes to raise the impressive structure.

"We had started studying New England," explained Mrs. Powell, upon her generally unnoticed return to the room, "and were talking about early American furniture, when someone said, 'Let's make a cradle.' The children began figuring out for themselves how big it would have to be for a baby to fit it, how many inches tall and wide and so forth, and they began using the tools furnished by the Project to make the cradle. Then they went ahead and made two bread trays and milking stools and more Colonial furniture. Then someone said, 'What are we going to do with this stuff?' And someone else said, 'Let's raffle it off,' and finally someone said, 'No, let's make a log cabin to put it all into.'

"Well, I thought we had been pretty ambitious last year. We had made a Conestoga wagon that the children could get into and haul down the hall. They had a ball with that. We used three- quarter inch plywood and glued it together. The children were so crazy about it that at the end of the year we hated to tear it down. The children had all kinds of encounters making that wagon -- just as they do with this log cabin. You can't do anything without involving arithmetic. You have to use a ruler all the time, have to measure for everything you're doing.

"I didn't have any idea that there was so much to making a log cabin -- and certainly they didn't. I thought they were going to make a little playhouse like the one that I bought for my daughter in a store. Soon I found out that these children really meant to make a real one. We talked about where to get the logs, and one of them got the idea of advertising in the paper. Well, that was a possible learning

experience, so Mr. Dispensa (Joseph D., Jr.), one of the roving consultants for the Technology for Children Project, took four of the children down to the Camden Courier-Post. The men at the newspaper were so impressed, they told the children not to prepare an ad but to write a letter. The children did so, and meanwhile a reporter from the newspaper wrote a separate story about the children and their project.

"A week later, a lady sent us a letter at the school to say she had three acres of trees and we could come down and help ourselves. The children made measurements on the classroom floor to figure out just how long they wanted their logs to be -- they decided on walls of eight feet -- and how many logs they would need for the walls and the roof. Mr. Dispensa got hold of a friend of his, Mr. Williams, who brought down antique tools and showed how the pioneers really did do all this. He gave this demonstration right in the woods. I don't think the children ever had a happier day in their lives. Also they learned to use hand saws and modern chain saws and cut down maybe ten trees, dividing them into eight-foot lengths. Mr. Williams talked with the children on how the pioneers used to shingle their roofs. The children decided that's what they wanted to do too, and Mr. Williams showed them how to make shingles. The Board of Education lent us a truck and driver to bring the logs to the school. The children carried them upstairs.

"The children got to work chiseling notches from the logs, two at each end, so the logs would fit neatly together. The day after the logs came, Mr. Dispensa came by just to make sure they got off on the

right start. He had them do a few notches right there, and this is all the training they had.

"Over in that corner you see a group of girls making a rug for the cabin floor. They planned and designed it on a piece of paper. Also they're making quilts. They measured out lines with rulers and followed the lines with their needles. This is the first time some of the girls had ever had a needle to make anything with -- anything at all. And they work. How they work on it -- it's marvellous.

"While half the class is working up here, the other half is down in the library where I've just been with them. They're working on a report on early Americans that is part of this unit. There's all kinds of involvement there. They don't copy out of a book, but actually put into their own words whatever they discover in their research. If they have to look up Harriet Beecher Stowe and don't know how to spell 'Stowe,' they have to go somewhere to find this out. It's real language involvement. Spelling, grammar, clear expression, everything about the language.

"Just yesterday I thought of a way of tying all this work even closer to the lives of many of the children. When we had started on the log cabin, we were talking about Daniel Boone and the pioneers and people like that. Now we're on the war between the states and slavery, and I came across a reference to slaves building their own log cabins on plantations and living in them. So we talked about that in class, and now the kids realize they are building not only the kind of log cabin that Daniel Boone and Abraham Lincoln had built for themselves, but also the kind that their own great-grandfathers

may have built and lived in.

"If the children could have their way, they would do this all day -- both the physical and the academic work connected with the project. Actually, I've taken some liberties with my schedule so that we cover much of the prescribed work during mornings. During two afternoons we have visiting teachers in special subjects. So that leaves us three afternoons a week for the log-cabin project, plus what other time I can find. A lot of the kids stay after school to keep working. You have no idea how amazing this is. Almost all the boys have been so-called 'problem children.' But since we've started this project, believe me, I haven't had to send one child to the office. I'm not going to try to explain in pedagogical terms what has happened. I'm not able to tell you. I only know that trouble has disappeared. Even in the mornings. Maybe they look forward to the afternoons. Attendance is now about 90 percent. The main reason for the remaining truancy is that I have some Spanish-speaking children who don't understand or read English and they stay away from school more often than the others. One was picked up by a truant officer yesterday. Yet the Spanish-speaking kids love this project. All the children do. They all love to use their hands."

One might think that such school enthusiasm on the part of disadvantaged children would cause the project to spread like wildfire through the school. It has not done so, although a small number of teachers occasionally indicate curiosity. This failure appears mainly attributable to the seemingly impenetrable walls of the self-contained

classroom and the minimal contact among teachers of the average schoolhouse. Mrs. Powell recalls only one strong expression of reaction from any teacher who was not part of the Technology for Children Project. This teacher said to Mrs. Powell in sympathetic camaraderie, "Louvenia, what a fool you are. You don't mean to tell me that you led all those kids out into the woods to cut down those trees." Mrs. Powell's astonishment at the remark was compounded. "Do you know who said that ?" Mrs. Powell asks. "He was a science teacher. All I could say was, 'If you could have seen the expressions on those children's faces....' and then I quit talking because I could never put it into words."

Mrs. Powell mentioned that the children had been expressing a desire to come to school on Saturdays to work on their project. This seemed a clear exaggeration, so the visitor decided to take his own vote among the children. His statement of the proposition was immediately greeted by enthusiastic raising of the children's hands in favor of working Saturdays on the log cabin.

Of course they could not do so because a custodian would be required to open the school and remain stationed there at a cost of five dollars an hour, for perhaps four hours. This, of course, was a very real obstacle. But it somehow dramatizes how small administrative obstacles often stand in the way of changing the entire quality of children's school experience while huge amounts of money continue to be spent on old ways of schooling that we already know lead to mass failure. Yet these huge expenditures and old ways continue year after year, largely unquestioned.

Another kind of learning experience, perhaps a broader, more sophisticated one, more appropiate to the suburban children involved, took place in the fifth-grade class of Miss Joan Gebhardt at Helen L. Beeler School, Evesham Township. The class organized itself as a company to manufacture rubber stamps. They not only mastered the technology of their business, but they learned to borrow money for capital equipment, to sell their product, to keep books and to enjoy the satisfaction of showing a profit. Some adults, upon hearing details of this success story, complain that the experience may be narrowing instead of broadening. Why should impressionable children be lured by cash profits when there are so many other worthwhile motivations to acquire -- such as the joy of learning for its own sake? This objection appears to miss the main point of the children's involvement. What clearly involves them is the sense of their own mastery over their learning and their feeling that they are doing something "real" instead of "fake."

A visitor recently strolled into the classroom toward the end of a school day. He found a boy at the back of the room working at a machine. They struck up a quiet conversation which went like this:

Visitor: What's your name?

Boy: Chris.

Visitor: Are you in the rubber-stamp company?

Chris: Everybody is.

Visitor: How does that work?

Chris: First you have to set the type. It's regular printing type. Then you put it in the machine with this stuff for ten minutes

to make it hot.

Visitor: What's that stuff?

Chris: Matrix.

Visitor: What's the matrix made of?

Chris: Some kind of cardboard with a plastic coating. Then you take it out like this and put it back in with a piece of rubber for thirteen minutes. It was supposed to be ten minutes, but we changed it because thirteen minutes comes out better.

Chris demonstrated how the finished piece of rubber is then pasted on a small wooden block to which a handle is screwed.

Visitor: Where do you get your orders?

Chris: Well, in the beginning of the year some kids went around door-to-door.

Visitor: Did any kids feel bashful about that?

Chris: No. A lot of people got about thirty orders and some got about three. I got twenty. After you get your order, you have to make your own rubber stamp. For every order you put your name on the board back here. When the person's name who's before you is finished making his, then it's your turn and you come back here and make yours.

Visitor: Does that keep you from your schoolwork?

Chris: No, not really. You do it when you don't have as much work as the others.

Visitor: What happens to all the money?

Chris: The company gets it. (He pointed to the blackboard at the front of the class.) So far we've made $398.01. That's in about three months.

The visitor learned from Miss Gebhardt that that handsome sum was by no means all profit. But in learning to calculate what part of it was profit, the children had an ever-widening learning experience.

In January 1968, Richard B. Harnack, a roving consultant (called a "research associate ") from the Technology for Children Project, happened to see a second-hand rubber-stamp making machine in a store window. It was priced at more than $100. This formidable price did not stop him from asking the pupils of Miss Gebhardt if they'd like to buy it. Where would they get the money? Mr. Harnack explained that new companies seldom have money for the machinery they need. But if they're really serious and responsible and prepared to work hard, a bank will lend them the money.

Within a couple of days a banker was in Miss Gebhardt's class explaining the terms on which the children's company could borrow. They were somewhat surprised that they would have to pay interest. Heretofore, they had only heard of interest paid by the bank. The banker explained that the bank is a company, too, and had to make a profit for its owners. In a few days, the class had its loan, co-signed by the school board.

Visitor: What other kinds of work do you have to do besides making the stamps?

Chris: Well, here are the books over here that we keep. This person's sold three $2.20 stamps, and all these one-line ones for eighty cents. When we add all this up, we know that person's sales. When you bring in the money and pay it to your committeeman, he puts it down here. And when we have to pay out money, they put that down too.

Visitor: So each pupil has a committeeman.

Chris: Yes. Everybody in the class is on some committee. Here are the names. Allen is the chairman of the Bank Committee. They take the money to the bank. This is the Pick-up Committee. They picked up the machine and they deliver rubber stamps to the post office if they have to be mailed out of town.

Visitor: What does the Planning Committee do?

Chris: They plan what we're going to do with the money. Maybe we're going to use it to go on a trip or maybe start a different kind of a company next year or maybe make rubber stamps with our own names on them.

Visitor: And the Problem Committee?

Chris: They figure out problems if the machine doesn't work or anything else, you know.

Visitor: Is all this more fun than school?

(By this time, a bell had sounded the end of the school day and almost the whole class gathered in a semi-circle around the visitor, Chris and the stamp-making machine. They couldn't resist answering the last question en masse.)

Chorus: <u>Yes</u>.

Visitor: Why?

A girl: You don't have to do work all the time.

Visitor: What do you mean by "work?"

Another girl: Reading or arithmetic or (said very disparagingly) <u>science</u>.

Puzzled visitor: But you have to do reading because you have to do the names right. And you have to keep a record of the money.

Children, indulgently: Yeah.

Visitor: Why is that any different than reading and arithmetic?

Out of a garble of laughter mixed with argument, one child piped: This is <u>real.</u>

Another child: An arithmetic book is just --

Another: This is real. When you just do problems on paper, ten to one it's going to end up in the trash can.

Visitor: So school work is work and this is not work.

A boy: Well, it's work in a way. But you learn more. I mean it's fun.

Visitor: What other businesses would you like to be in later?

Boy: Printing.

Girl: Yeah. A newspaper.

Clearly, the interests and ambitions of these children would change several times before any of them had to make real occupational decisions. But the exciting world of occupations -- and the relevance of education to work -- was already opening wide. Manipulative training did not restrict them to thinking of manual work, nor did the verbal character of their business restrict them to academic thinking. From rubber stamps to a newspaper is a wide range for a child to think in. The important thing is that at ten years old they were thinking occupationally, and joyfully so.

"My choice to go into industrial arts," Elizabeth E. Hunt, founder of the Technology for Children Project, recently wrote, "was due in part to the response I observed in children when they had an opportunity to be active, explore, and manipulate concrete materials in their environment. I discovered this response in a traditional school setting. It was quite obvious that these activities were more in harmony with what children were seeking than the facts which we adults considered important and prevailed upon them to learn....

"Since this discovery and rediscovery of the obvious joy, interest, intensity and perseverance on the part of children for industrial arts activities, I have been searching for reasons. This quest has led to some very basic principles on 'the nature of knowing.'

"How should these affect what we do in our elementary schools and/or nursery schools?

"First of all we should stop kidding ourselves that we can 'motivate' children. They, and they only, have the motive power. Since in the area of technology we work with tools, materials and processes, our area has a direct appeal to the exploratory, manipulative behaviors.

"The problem is one of designing the school environment so that there is maximum opportunity for this interaction to take place. Maximum opportunity for interaction would mean that there would be a diversity of things with which to interact. Any school which does not include opportunities to interact with those things which are of

technology is impoverishing the learning environment and limiting the intellectual development of children in a major area of human endeavor. Montessori said, '...a man is not what he is because of the teachers he has had, but because of what he has done.'"

In late 1966, Miss Hunt and her chief, Dr. Worthington, aided by an advisory council, worked out a plan for a K-6 program rooted in activity with tools and materials. They decided that the key to success was the elementary classroom teacher. Miss Hunt prepared a proposal to The Ford Foundation for a summer institute for training teachers in an actual classroom laboratory -- with children. The Foundation granted $37,000 for the first summer, and subsequently $32,000 for a second one. Twenty-two teachers were selected from nine schools around the state.

In a recent talk before the annual convention of the American Industrial Arts Association, E. Arthur Stunard, assistant director of the project, discussed the teacher-preparation institute:

"The central theme of the program is essentially that of problem solving. Each participant is posed with a series of problematic situations which include both tool and material experiences. While tool manipulation is important, a high degree of knowledge about any specific one is not critical at this point. Tool skill is not the main objective, but rather that the newcomer knows of its existence and that through a problem-solving approach, he can apply his knowledge to whatever task needs to be accomplished.

"Large group demonstrations are not generally used because of their ineffectiveness in a creative, non-directive approach. Showing a student how to use a tool when he may not need it for some time is purely a waste for everyone concerned; a sort of individualized instruction must go on at all times....

"It is extremely important to note that whenever people are subjected to new experiences, such as the tools and materials of technology, they automatically go through a feeling of inadequacy, a feeling that everyone present knows more about the area than they do. It is vital to recognize and plan for this period.

"I am convinced it takes a minimum of two six-week institutes plus ongoing follow-up with actively supportive consultants, during each successive school year to truly change the classroom teacher.... The elementary classroom teacher requires a minimum of two years (two institutes and two successive school years with children in the classroom) to become truly changed and ready to initiate a program of this type with elementary school children. This change may seem slow, but effective change is slow....In a program of change, talking or lecturing is at a minimum. Doing, acting upon, observing, and questioning is at a maximum. Respect for each individual's thoughts is a must....

"Up to now, college and high-school curriculum seems to stress the abstract forms of education as being the scholarly thing. Consequently, the elementary classroom teacher has never had any real training within the active framework of concrete learning or experiences."

An important practical phase of teacher preparation takes place during the four weeks that children are present at the institute. Each teacher is asked to select one child to observe, and to keep an anecdotal record of his activities for at least 1 1/2 hours each day. "It is an excellent opportunity," says Mr. Stunard, "for the professional teacher to look at a child in an objective way and to see him as he really is -- living, active, investigating, constantly digging for facts, moving things around, putting things together, feeling, smelling, and sometimes being a very mischievous fellow."

A sample section taken from one of these anecdotal records conveys the learning that takes place, both in the observation by the teacher and experience of the child. The observing teacher, Judith Ann Motley, was assigned to record development in the area of reading and language. The record is of six-year-old Noreen who had had one year of kindergarten:

> The children were learning about electricity and conducting various experiments... to determine what objects were conductors and what objects were non-conductors. Noreen went to the front work space and asked to work.
>
> Miss S said, "Noreen, I will help you strip that wire. Why do you support I have to strip it?"
>
> Noreen answered, "I don't know."
>
> Miss S said, "This covering is a non-conductor."
>
> Noreen said, "Oh, electricity doesn't travel through plastic."

Miss S said, "Right."

Noreen continued to work on connecting the wires to the batteries. Noreen turned to Lisa and said, "I need the screwdriver."

Noreen stamped her foot and said, "How come this thing isn't going around?" (She was trying to wrap the wire around the top of the battery.)

Miss S said, "You can ask for help when you get into trouble."

Noreen answered (in what seemed a disgusted tone), "Oh, boy!"

Miss S asked Noreen, "What do you mean, oh boy?"

There was no explanation from Noreen. Instead, Noreen walked over to the tool cart and got a nail set, came back to the table and put it on the screws, touched the wire to it and the small bulb lit up.

Noreen said, "Miss S, it's a conductor!"

There were numerous experiences provided for the children in the Institute which broadened each child's language expression and vocabulary building. Such an experience was a demonstration given by a telephone man. He brought his truck and explained about safety, his equipment, how the telephone worked, what he did on telephone poles, and the different wires that were on the poles. The telephone man was explaining the parts of the telephone and had just demonstrated the ringer when Noreen spoke out and said, "Sounds more like a bell."

The telephone man said, "That's what it is, a bell. We call it a ringer."

Spelling was integrated frequently in the program as is evidenced from Noreen's record. The children were preparing to start a project and were discussing the tools they would be using and their names.

Mr. J asked the children, "Why do you call it a hand saw?" He was holding a hand saw before the children.

Noreen answered, "Because you use it with your hand."

Mr. J wrote on the board the words "hand saw." Noreen watched as he wrote the words on the board and began to spell out the letters. Noreen spelled out loud, "H-a-n-d s-a-w."

Mr. J turned back to the children and asked, "Used for cutting what?"

Noreen said, "Wood."

Mr. J held up a hack saw and said, "Ever see one of these before?"

Noreen looked and then said, "No."

Mr. J wrote on the board the words "hack saw."

Again Noreen watched and began to spell, "H-a-c-k s-a-w."

The children then began to discuss the jig saw. Mr. J asked, "It runs by-----?"

Noreen answered, "Electric."

Mr. J wrote the words "jig saw" on the board.

Noreen spelled out the letters, "J-i-g s-a-w."

Another participating teacher, Carl J. Roache, was assigned to observe a boy's development in mastery of scientific principles. His

subject was Juan, about to enter fifth grade, whose family had arrived from Puerto Rico three years earlier:

> As the Institute continued, Juan developed an increasing proficiency in the use of tools or scientific instruments.... Juan also was exposed to a wide variety of scientific principles. That he didn't know the names of the principles is of little importance. What is more important is the fact that he saw these principles in action and in fact demonstrated these principles to himself. For example, he saw Newton's action-reaction principle at work in an attempt to launch his rocket ....Juan also saw a demonstration of Bernouilli's Principle which explains why a plane is able to fly. His interest in this principle of flight was demonstrated when he turned to a child next to him and asked, "What are the two little bubbles on the wing?" He was told that they were air molecules. He seemed satisfied and listened with rapt attention.
>
> Juan also discovered that mathematics was an important concept in his work. During the Institute, he utilized a number of measuring devices....Juan also saw the pitfalls involved in inaccurate measurement. For example, in making the wooden sides for his plaster mold, he saw that the pieces didn't fit properly because of his carelessness in measuring pieces.

Major innovations often founder on the rock of finance. Where is the cost of change to come from? Innovative as the Technology for

Children Project may be, Assistant Commissioner Worthington sees financing as not a major obstacle in spreading the project around the state to the growing number of schools that want it. The major cost is that of preparing teachers in summer institutes. Two pilot institutes were financed by The Ford Foundation, at a combined total of less than $60,000. Dr. Worthington expects that future replications of these institutes can be financed by federal funds under the new Education Professions Development Act. Equipping a classroom with tools and materials, once its teacher has been tained, costs $457.38, hardly a major cost when it is considered that the tools will remain in use for several years. The cost for subsequent years, chiefly for expended materials, is $140.28, generally averaging less than four dollars per year per child.

SETTING PERFORMANCE OBJECTIVES FOR LEARNING

At any given point in a student's education, the goals of his total schooling, of each individual course, of each lesson unit, must be specific and known to both the teacher and the student. Otherwise, the probability will be high that the "educational" process will be diffuse, unclear, largely irrelevant to a long-range purpose, and unlikely to hold a student's attention.

A great deal of attempted change in education starts not with definition of goals, but with agreement that present teaching behavior is not accomplishing a desired result, followed by an attempt to modify the old professional behavior.

If schools are to be designed to serve a purpose instead of a process, they must start with examining the needs of students, then organize to serve them. If this requires that occasionally a student be served individually by a teacher, a way must be found to make this possible. If it requires that a teacher occasionally remove himself from a student's studies, this too must be made possible. The central issue in the design of education is the student and his learning, not the teacher and his teaching.

The purpose of this booklet is not to identify and define all the possible goals of a school, although the idea is advanced here that these goals must be more precisely defined. Its purpose is to deal with a single important goal: that the long period of a youngster's schooling effectively prepare him for entering a career, or several

careers. A school should serve this purpose whether a youngster is headed for college, technical school, a job immediately upon graduation, or if a student drops out of school before graduation. It must serve this purpose whether or not a student decides on a career before leaving school, whether or not that early-chosen career indeed becomes his lifetime work.

If this is to be accepted as a major goal, what learning must take place to fulfill it? In the recent past, a major contribution to educational research has been a study called "Research on General Vocational Capabilities (Skills and Knowledges)," conducted for the American Institutes for Research, by Dr. Robert M. Gagne and Dr. James W. Altman. The investigators identified a number of basic areas of general vocational capability that precede the acquisition of specific vocational skills. These general areas of knowledge are basic to modern life whether the student eventually becomes a scientist or technician, a businessman, a white-collar worker in a large organization, a teacher or a housewife. They are the foundation of much useful operating knowledge for the modern world. These areas are:

1. MECHANICAL. This area deals with the basic elements of machines and mechanical principles, whether motor cars or kitchen mixing machines, lawnmowers or steam shovels. It covers the elementary mechanical principles at work in common types of tools, connectors, fittings and fluid systems, among others.

2. ELECTRICAL. This area would encompass concepts and principles of electricity, electro-mechanics, and electronics commonly applied in

work and home situations. While this basic area might be an effective prelude to learning for the future appliance-service man or electrical engineer or physicist, it would also serve anyone whose home life is dependent upon table lamps, vacuum cleaners and TV sets, upon the electric wiring that runs through almost every wall.

3. SPATIAL. Concerned primarily with the application of geometric, numerical and drawing techniques to the problems of simple structural design, this area would provide the elements of visualization of layout, as well as uses of building materials and construction methods that touch on the lives of every citizen, besides having special relevance for the future draftsman, sheet-metal worker, carpenter, civil engineer and architect.

4. CHEMICAL-BIOLOGICAL. This area would cover elementary concepts of chemistry, biology and physics that apply to common problems of all, including principles of hygiene and chemical dangers of the modern world. Besides its general usefulness, the area is relevant pretraining for the future medical technologist, x-ray technician, nurse, physician, dentist and laboratory scientist.

5. SYMBOLIC. This area brings together the major verbal and numerical skills that are now taught with such emphasis in public schools, not always with great success. Much educational theory suggests that these symbolic areas would be learned with greater success if their substance were based more on the real-life areas of knowledge described in the preceding items.

6. PEOPLE. As the A.I.R. report describes it, this area would be "primarily concerned with aspects of human interaction and relations frequently encountered in jobs," including style, grooming, etiquette and job conventions, as well as ethical, legal and social requirements of living in modern society. The field might include such sub-topics as "sales" and "service."

7. PSYCHOLOGICAL PROCESSES. So much of present teaching is based on how people "ought to" behave and so little on the vast amount known of how people do behave. If children systematically learned what is known of human behavior, they might acquire a better understanding of themselves and people around them than they now do from exhortations on "good behavior" which do not jibe with their observed world.

The Gagne and Altman study concluded: "We would contend that the very core of a curriculum having general occupational relevance is missing from the experiences of most American students and still will be when curriculum efforts which have been launched to date come into use. We would call this central core of a vocational curriculum something like 'basic job technology' and set as its purpose the inculcation of a broad spectrum of capabilities of the sort which we have attempted to outline in this report. Finally, we would contend that substantive progress of the magnitude appropriate to the importance of such a curriculum will require time and talent of the order devoted to modern overhauls of basic academic curricula."

That set of goals would provide a broad vocational underpinning to the content of schooling. A major remaining question is how the method

of education can insure vocational preparation, whether generalized or specific. An important new body of educational researchers are advancing the belief that effective learning must rely on the attainment of specific performance objectives. Among them are Gagne and Altman; Robert F. Mager; David S. Bushnell and Robert M. Morgan of the U.S. Office of Education Bureau of Research; L. V. Rasmussen and Thorwald Esbenson, Superintendent and Assistant Superintendent of the Duluth, Minnesota Public Schools; Robert Pruitt, Superintendent, Quincy, Massachusetts Public Schools.

"The strategy of developing effective instruction," say Robert Mager and Kenneth M. Beach, Jr., in their book, Developing Vocational Instruction, "is one that called for performance orientation rather than subject-matter orientation. The strategy is to use the job [or educational goal] as the basis for deciding what will be taught and in what order and depth, rather than simply to present as much subject matter as possible in the alloted time."

To develop this procedure, Mager and Beach say, one must:

1. Determine and describe what it is we want to achieve;

2. Do what is necessary to achieve the desired result and

3. Check to see that we have succeeded in doing what we set out to do.

Performance objectives, according to Mager, have the following characteristics:

1. An objective says something about the student. It does not describe the textbook, the instructor, or the kinds of classroom experience to which the student will be exposed.

2. An objective talks about the behavior or performance of students.

It does not describe the performance of the teacher, nor does it describe what the student is expected to "know or understand."

3. An objective is about ends rather than means. It describes a product rather than a process. As such, it describes what the student is expected to be like at the end of instruction rather than the means that will be used to get him there. It talks about terminal performance rather than course content.

4. An objective describes the conditions under which the student will be performing his terminal behavior. In some cases the student will be expected to perform in the absence of any assistance provided by job aids; in some cases, such aids are acceptable. For example: sometimes the student will be expected to solve problems with the use of a slide rule or calculator, and sometimes without these items.

5. An instructional objective also includes information about the level of performance that will be considered acceptable. If a student will be expected to perform a task within five minutes at the end of the course, this will be stated as part of the objective. If his performance at the end of the course is expected to be error-free or if some error will be tolerated, this would be indicated. In most instances, the decision about what performance will be considered acceptable is an arbitrary one. This is one place where the experience and wisdom of the instructor is most important, because specification of satisfactory performance is one of the unique contributions that can be made only by the skilled instructor.

Creation of performance objectives, says Thorwald Esbenson of Duluth, "is often a difficult thing for teachers to learn to do. The

main reason for this would seem to be that in education the word objective has generally meant purpose. And when educators speak of purpose, they almost invariably use words such as understanding, comprehension, and appreciation. These point to noble aims, no question about that. But when left wholly in this form they do not refer to anything that is directly observable and, therefore, do not permit us to evaluate how well we are doing whatever it is we are trying to do. The trick is to supplement each announcement of purpose with a statement of criterion performance....The emphasis here is on the word do. And the doing must be observable. A warm feeling in the pit of the stomach is not sufficient."

In Duluth, Minnesota, performance objectives have become a substantial part of the learning process for a pilot group of about 1,500 out of a school population of 22,000 youngsters in the elementary and secondary schools. This pilot program is concentrated mainly in the 5th, 6th and 7th grades.

The project is most visible in the 5th and 6th-grade classes of Congdon Park Elementary School, where the physical plant partially has been designed as a setting for individualized learning. A visitor entering this specially-designed portion of the school first walks into a library area, which might better be called an instructional materials center. It is an area rather than a room, for it is not separated by walls from the instructional areas that surround it. The instructional areas are three large classrooms, but hardly conventional ones. Each is the equivalent in size of four ordinary classrooms. The entire wing

is carpeted and has accoustical tile ceilings. The overall impression is of a large, flowing open space.

Each classroom is in the charge of a team of four teachers. They supervise about 120 children who move about freely, working in small groups, pairs or alone. Thus the teacher-student ratio is about 30 to one, similar to that of ordinary, self-contained classes. While a teacher in a self-contained classroom of the elementary grades ordinarily directs activity in all subject-matter areas, each Congdon Park teacher is in charge of specialized subject-matter areas for an entire group of 120 students. One teacher may direct study in science and music if those are the subjects to which he brings the best preparation and enthusiasm. Another may pair English and social studies; another, math and physical education, and so forth.

A necessary preparation for teachers to conduct their classes with performance objectives is to be involved in writing them. At Chester Park School, each teacher entering the project had 210 hours of paid in-service work writing performance objectives and exploring instructional materials useful in enhancing self-directed study. These objectives and self-directed study materials are imbeded in what are called "student contracts." In individual or small-group conferences with students, a subject teacher assigns and discusses one, two or more contracts to be assumed by each student and to be completed in a day or two, perhaps a week. The student, working with others on the same contract and with prescribed study materials -- books, filmstrips, records, manipulative materials -- reports back to the appropriate teacher upon completion of his contracts. He is then assigned subsequent ones.

In displaying contracts used at Chester Park, Esbenson emphasizes that the performance objectives currently in use are far from ideal. Many continue to emphasize pencil-and-paper performance rather than accomplishment with real objects; they are still rooted in abstract, school-book concepts rather than doing real things relevant to real life. But they are the best objectives on hand until teachers themselves become more familiar with the goals of performance objectives and learn to produce more realistic ones. The following are several typical samples of 6th-grade objectives, one in humanities, one in music and four in mathematics:

Content Classification

Humanities

Purpose

To develop an understanding of the physical earth along with some of the man-made aspects of culture in the various parts of its world.

Criterion Performance

Given papier mache' materials, a spherical object, and painting materials, the student is able to construct a spherical model of the earth and, in a suitable fashion, indicate one or more of the following: 1.) Racial patterns throughout the world, 2.) Main religions of the world, 3.) Basic languages spoken in various parts of the world, 4.) Any other topic approved by the instructor.

Resources

___A. Learning to Use a Globe, Set 1, A. J. Nystrom and Co.

___B. Fun With the Globe, Set 2, A. J. Nystrom and Co.

___C. Any available globe.

___D. Elementary Mathematics - Patterns and Structure, Book 5, pp. 197-199.

___E. The pamphlet, Instant Papier Mache' by Celluclay Co., Inc.

___F. The pamphlet, Fun With Papier Mache', by Hazel Person Handicrafts.

___G. Teacher-led presentation.

___H. Any available encyclopedia.

* * * * * * * *

Content Classification

VI. Instruments of the Orchestra

A. Visual identification

B. Sound identification

Purpose

To develop skill in identifying the instruments of the orchestra both visually and aurally.

Criterion Performance

Given a recording of the sounds and pictures of the instruments of the orchestra, the student is able to match the sounds of each instrument with its picture with a 90% accuracy.

Resources

___A The recording, "Instruments of the Orchestra," by the National Symphony Orchestra.

___B. The Filmstrip, ST-099, "Meet the Instruments - Strings, Woodwinds, Brass, Percussion." (accompanying tape)

___C. The filmstrip, "The Heart of the Orchestra," A679-1, and accompanying tape.

___D. The filmstrip, "Singing Brasses," A679-2, accompanying tape.

___E. The filmstrip, "The Woodwinds," A679-4, and accompanying tape.

___F. The filmstrip, "The Beat of the Drum," A679-4, and accompanying tape.

___G. The filmstrip, "Keyboard Instruments," A679-5, and accompanying tape.

___H. The filmstrip, "Folk Instruments," A679-6, and accompanying tape.

___I. The book, Shining Brass, by Lerner Publications Co.

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Content Classification

1. Number Systems
    A. Whole Numbers
        1. Operations - Machine calculation
    B. Rational Numbers (decimals)
        1. Operations - Machine calculation

Purpose

To give the student skill in the use of a machine calculator and appreciation for its function in today's highly computerized society.

Criterion Performance

Given the MONROE Classmate machine calculator and 20 problems involving addition, subtraction, multiplication, and division in the sets of whole and rational numbers, the student is able to use the calculator to determine the indicated sum, difference, product, or quotient with an accuracy of 100%.

Sample Test Item

Calculate the following on the MONROE Classmate:

1. 9,845 + 4,321 + 1,045
2. 1,045,210 - 154,321
3. 5.67 x 34.68
4. 9,875 ÷ 58

Resources

___A. The MONROE Classmate calculator

___B. Practice problems found in Elementary School Mathematics, on pages 311-313, 321-323.

___C. Mr. Koch

___D. Teacher-led presentation

___E. Instructional materials to go with the Classmate Calculator.

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Content Classification

VI. Geometry

A. Non-metric

Purpose

To be able to differentiate a plane figure from a space figure.

Criterion Performance

Given the necessary tagboard and paper, the student is able to construct three space figures (rectangular prism, cone, tetrahedron, etc.) and three plane figures (circle, triangle, etc.).

Resources

___A. Elementary Mathematics - Patterns and Structure, Book 5, pp. 179 and 197-199.

___B. Elementary School Mathematics, Book 6, pp. 208-212.

___C. Worksheets for construction of space figures, including a sheet on each of the following space figures: prism, pyramid, cylinder, cone, sphere, cube, tetrahedron.

___D. Teacher-led presentation.

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Content Classification

C. Rational Numbers of Arithmetic

i. Definition

Purpose

To know that a fractional number has many names and to

develop skill in listing the set of equivalent fractional names for any fractional number.

Criterion Performance

Given ten names of fractional numbers, the student is able to list the set of equivalent fractional names for each fractional number using the identity property of multiplication with a 90% accuracy.

Sample Test Item

List the set of equivalent fractional names for each.

3/4 1/2 1/4

Resources

___A. Elementary School Mathematics, Book 6, pp. 104-105.

___B. Elementary Mathematics - Patterns and Structure, Book 5, pp. 210-213.

___C. Elementary Mathematics - Patterns and Structure, Book 6, pp. 202b-203a.

___D. Film #0425,"How to Change Fractions."

___E. Filmstrip #207,"Different Names for Same Fractional Numbers." SVE

___F. Filmstrip #215,"Using One to Rename Fractions." FOM

___G. Filmstrip #276,"Equivalence Relations Among Fractions." eye gate

___H. Teacher-led presentation

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Content Classification

VIII. Organizing and Reporting Data

A. Constructing graphs representative of data.

1. Circle graphs.

Purpose

To understand and construct circle graphs from data through the assignment of parts of a circular region as fractional parts of a whole.

Criterion Performance

Given an unorganized set of data, the student is able to organize the data and, if possible, construct a circle graph to represent the data.

Sample Test Situation

If possible, construct a circle graph to represent the unorganized data given below.

IMPORTS FROM THE UNITED STATES IN MILLIONS OF DOLLARS

Venezuela	$809	Peru	$167
Columbia	$185	Cuba	$546
Argentina	$249	Brazil	$530
Central America	$322	Mexico	$886

Resources

___A. Elementary Mathematics - Patterns and Structure, Book 6, pp. 404-406.

___B. Mathematics for the Elementary School, SMSG, Grade 6, Part II, pp. 531-536.

___C. Filmstrip #502, "Circle Graphs," A Curriculum Filmstrip, Education Projections, Inc.

___D. Teacher-led presentation.

The philosophy and actual operation of the contract system in Duluth is perhaps best described in question-and-answer form based on an extended conversation with Mr. Esbenson:

Q: How is a student's time organized when he is working independently or in small groups on a contract?

A: A student will have at least one contract, perhaps a series, going in each of his subjects. These contracts will keep him busy in that subject for one to five days. A teacher may also schedule what we call "teacher-led presentations." For example, let's suppose that a teacher happens to have 12 students who are signed at a given point in time to the same contract. They're using various instructional materials and so on. Let's suppose that six of the students seem to be working along all right, but six are having troubles. The teacher may then schedule a TLP -- that's a teacher-led presentation -- for the six that are having problems. This will be scheduled for a certain time and a certain area; those six students are responsible for being there. They budget their own time for these scheduled TLP's. A student has certain other mandatory things. If he has physical education, he has to be there. If music involves

some kind of group activity, he has to be there at a scheduled time. If in art he's working on a group project, like making wood prints, a project involving three or four kids, he has to meet that obligation to make it work out. This is not a program without structure, but it has a different kind of structure. In between these obligatory activities, he moves about freely selecting his materials or sits at a vacant place at any table to accomplish his contract work.

Q: Then he won't have a certain scheduled period for, say, a social-studies hour?

A: No. There isn't any such thing as a social-studies class. There is a social-studies contract. One of the four teachers in his large room is responsible for working with students on their social-studies contracts. He'll consult with these students all through the week, at any time a student completes a contract and is ready to start a new one, or at any time the student needs help in the course of one. This system is what enables a teacher to concentrate on the two subjects that he's best at. We have a feeling that there are simply not enough Leonardos or Benjamin Franklins to staff classrooms. Teachers have strong areas and weak areas just like everybody else. It makes more sense to have teachers sharing those teaching strengths. Now that may not seem very different from specialized teachers among whom students move from room to room.

One of the differences between this and the departmental set-up is that, under the old system, the math teacher doesn't know what in blazes the social-studies teacher is doing and often couldn't care less. Heaven only knows that the science teacher is doing or the English teacher. They're isolated. Here, these teachers, while they're sharing their teaching strengths, work together. It's a form of team teaching, but it's not the kind where you have a master teacher and certain teachers under him. They all act as a committee of specialized equals.

Q: Suppose you have a student who loves map reading. He's likely to whizz ahead on contracts involving map reading, move way ahead of his accomplishments in other subjects.

A: That's fine as long as he is fulfilling his obligations in other subject-matter areas. We're not interested in achieving a series of flat student profiles. Let him go further ahead in a subject that grabs him. But it's not a question of feast or famine. He cannot just turn off mathematics or music. That's why the team of teachers is so important. The teachers meet every week to discuss in a brief way the progress of each student.

Q: Well, suppose a student falls way behind in his math contracts, just neglects them. He assures his teacher, "Okay I'll do them," but then the end of the day comes and he hasn't worked on math. What happens?

A: Well, this does occasionally happen. One of the things the teacher could do of course is give the kid twenty lashes. But this

is not our usual procedure. Another thing they can do -- and they do sometimes do this -- is to schedule the student into the math area. In other words, as a kind of punishment, they put the kid on a schedule. They make it like school. They don't use that phrase, but the student knows that that's what it is. And this is a blow to the student usually, because the student values his independence. There may be buddies the student likes to work with, but now he's limited in his freedom to do so. His friend says, "So long Tom, I'm going over to the social-studies area. See you around." The student who is scheduled is now stuck. He has to stay with math. Another method of dealing with goofing-off is to send a note home to the student's parents saying that the child did not satisfactorily complete contracts in certain subject-matter areas. So there are checks.

Q: Suppose the student is fulfilling his contracts, but the teachers know the student has the capacity to do twice as much.

A: Ideally, you try to find things that are going to engage the student's interest. If you can do that, you won't have kids falling down in the classroom. This depends so much on the student's ability to use imagination and the time of the teacher when the student needs it, the availability of materials and activities and what-not. This is an area that's going to be a long time a-blooming. If you take a look at what all of us are presently doing in our learning activities -- the low-level, pedestrian kinds of things by and large -- you see all around you the kinds of learning experiences that are not usually

going to be exciting to kids. There are some note-worthy exceptions. For example, in math we have been getting some Madison Project material, which involves a great deal of manipulative activity. Apparently this helps the students respond. They like this kind of stuff. I am strongly of the opinion that we need to put a lot more effort into acquiring and organizing manipulative materials and activities. I have a very deep feeling about this, but you cannot accomplish this simply by pushing a button. It requires slow, hard work. You need the money, the continual upgrading of teacher background in knowing how to use them. In-service work is just essential, and it's a long-term kind of thing.

Q: Is it a matter, then,of <u>things</u> that you think make the difference?

A: No. The essential thing is whether the emphasis is on the output of the learning process, rather than the input. Usually school systems have been talked about in terms of things instead of functions. We talk about a 30-to-1 student-teacher ratio. That's a <u>things</u> kind of thing. We say so many books per class, so many hours per subject, so many credits per course, so many buses and so forth. We talk about administering functions instead of accomplishing goals. What we know about individual differences indicates that kids are going to be fanned out so that they're working at different things simultaneously. If these differences are to be respected and dealt with, it is simply not feasible for teachers to put on their track shoes and get around the class for all these kinds of students. That is just not workable. If study i s to be individualized, a large part of the work is going

to have to occur by the student's interaction with his environment, including the materials, the non-human environment. You might call it the "delayed human environment" in the sense that a book is a contact with another human being, separated by time. How do you help shape a student's actual performance so that it begins to approximate to a satisfactory degree the desired performance? One of the things you do is to have the interaction take place in such a way that there is feedback. Just as when you're driving an automobile, you've got feedback. If you go off the road, you know it. You need to have materials that give a student feedback information as he proceeds, so that he is helped in shaping his own learning activity. You need to have feedback built into the materials. Feedback tells you whether a student is ready to move on ahead to the next study unit -- or the next contract -- or whether he needs to hit the old one a little harder. Contracts do that by being very specific in naming not only what a student must be able to perform but under what conditions he must perform it. This is all essential to the task of developing a systems approach to individualized instruction. In a good system, if a student is not working satisfactorily, after a certain point of time an alarm buzzer has to be set off to alert the teacher. Otherwise, the system is not going to work efficiently or effectively. Under the present lock-step system which dominates most of our schools, there are not effective alarm buzzers. A teacher may know what he has attempted to teach but he does not have very effective ways of knowing what has been learned. An occasional quiz may help him spot-check areas of learning, but does not really tell him what the troubles are with the individual students or how to

correct them. The big questions in building new systems of education are such things as how is that alarm bell going to be fashioned? What's going to trigger it? What kinds of sensitivities are going to have to be built into the systems? These questions have to be analyzed in this way if we're going to develop anything that is high-powered. What we're doing here is still low-level, quite primitive. But I think we're asking the right questions.

Q: A lot of educators, a lot of schools, have recently claimed that they are instituting individualized instruction. Do you feel that they are?

A: One of the indicators is whether their courses are still built upon time served or upon demonstrated achievement. I think you'll find that most are still a matter of time served. They talk about a two-year course. Or they'll talk about modular scheduling which means they have made their time of input more flexible without any new measures of output. But here is a valid question: "Suppose a student already knows ninety percent of the content of a two-year course when he enters it. Can he get out of the course in six months instead of two years?" It turns out, in just about all cases, that the answer is no. That old indicator of time served -- which dominates just about everything we do -- is very dreary.

Q: Do you find that many students move ahead faster by interacting with materials at their own pace instead of being paced by a whole class and a teacher?

A: Often, yes. But often no. This is partly due to the inadequacy of the materials that clutter our schools which can often be as hampering to the learning process as a lecture in a lock-step class. What materials

do we have to work with, for a student to interact with? Take filmstrips. Filmstrips are probably the poorest kinds of materials on the educational market today in terms of pizazz. They're dull, dull, dull. They have thoselittle captions on the bottom of the picture. In supposedly individualized instruction, a student may read these dull lines "at his own pace." In another class a teacher stands behind a projector and reads the caption out loud. It's just dreadful. There's no reason why filmstrips, by their nature as a medium, have to be dull. They just are. We include filmstrips as materials to use in achieving performance objectives on a "best-fit" basis, but that best fit has usually been a very poor fit. They were not prepared with our kind of performance objectives in mind. They are merely topically related to our objectives, which isn't saying very much. We also have all kinds of music records, spoken-word, dramatic and so on. Some of these are beastly little records on social-studies events, dramatizing something like Columbus discovering America. You hear those dumb footsteps going down the plank to accompany a picture, you know. Really dreadful.

Q: Have your teachers made an effort to choose the best ones available?

A: These are all that are available. They're no more interesting than textbooks. It's just that they're a different format, and the student may get a small kick out of a change in pace.

Q: While you're trying to make schools goal-oriented instead of process-oriented, how do you know that you are achieving some of your goals? What do you know about how this new program is working out?

A: This is a difficult area still ahead of us. Standardized achievement tests are not really very satisfactory. As we become more interested in strategies of developing inquiry on the part of students, we find that standard achievement tests are not slanted in this direction at all. They're primarily knowledge-oriented. They ask a student to regurgitate certain kinds of information, but do not get far into the area of testing the development of his curiosity or problem-solving ability. Presumably, there are tests that could be designed to do this but they are not here yet. Another thing is that we're interested in the development of students' attitude towards school. Robert Mager has what he calls his "universal objective" -- that whatever else you might want to accomplish with students, you certainly want to give him a more positive, affirmative feeling about his experience with subject matter. If a math class has mainly succeeded in turning a student off in math, made it an unpleasant experience that he wants to avoid further contact with, then you have done him harm. If a student's attitude is positive, you know he's an increasingly potential learner. That positive attitude is something we'd like to learn to measure.

Q: Have you been able to do anything to measure these attitudes?

A: Just on a very simple level, yes. In one of our schools where there's heavy Title I investment, we simply asked students and parents, "Do you -- or does your child -- like school better this year than in the past?" In both cases, we got seventy-six percent saying yes and something like fifteen percent saying no, the remainder having "no opinion." These responses were anonymous, so I would assume

they were honest in intent. Whether they were accurate is anybody's guess. The purpose of the survey was to compare whether the new, individualized program involving contracts and performance objectives produced more positive attitudes than the old system.

Q: What does your program cost?

A: Getting a project like this off the ground should take roughly $3,000 per classroom teacher, or per thirty students. That's a one-time cost for a wide variety of instructional materials such as self-study kits, booklets, tapes, records, filmstrips, strip projectors, movie projectors, tape recorders, record players. There are replacement needs and a gradual depreciation of materials and so on, but we have experienced no appreciable need for significant funds beyond that initial cost. It's like stepping into an open elevator shaft. The first step is a honey, but after that it's nothing at all.

Q: Once having made that initial outlay, the cost of one of these very enriched-looking project classes is no more than any other class in that school?

A: No, not after that initial outlay. In fact, you get more bang for the buck. Ordinarily, we would buy thirty copies of a textbook for the class. With this new kind of arrangement, you can buy five copies of six different titles for the same amount of money, because not all the children are working on the same thing at the same time. You get six times as much range immediately for the same budget. This makes an enormous difference in your capability, the range of instructional materials a child can call upon.

Q: How does somebody begin to emulate your experience without going through all your growing pains?

A: I would say start small. That can be as small as a single teacher and a single classroom. The important thing is to have a commitment on the part of staff that's going to be involved in this. This is just crucial. Don't start with reluctant dragons. They'll kill you. Start with staff members who are really motivated to go on this. Next, the staff members have to begin spelling out objectives in terms of observable student performance. Observable student performance may or may not mean pencil-and-paper kinds of performance. You may have a science objective such as the following: Given a box containing twenty creepy crawlers, the student will be able to identify five of the insects and will do this without error. Now that's not a paper-and-pencil performance objective. You say: How are you going to test the student? You obviously do not show him some drawings of insects and say: Circle the ones that are insects. You give him a box containing twenty creepy crawlers. Or you tell the student to go out for a walk in the forest and bring back twenty leaves of deciduous trees of five different varieties with no more than two errors. That's a performance objective. You see, the test situation is immediately made clear. The test situation is imbedded in the performance objective.

I think it's important for school systems that are going to get into this kind of program to begin by having their teachers try to spell out some performance objectives. It's good to have teachers

get the feel of thinking about education in this way. So that is number one. The second reason for having teachers do it is that at the present time there is no organized body of performance objectives that have been spelled out for any subject-matter areas of which I am aware. Even though I'm saying teachers should get the hang of this business by writing their own objectives, I do not feel that in the long run it's feasible for the local school district to do this. I do not feel that classroom teachers generally have this kind of background. They simply do not come to the task with this kind of preparation. This is a task that needs to be accomplished by persons who have spent most of their professional lives thinking deeply and hard about these kinds of matters. It is my opinion that there is a need for the creation of a task force drawn from the best people across the country from a variety of disciplines. People from testing enterprises, from publishing, scholars, learning specialists, you name it, all brought together in a project to spell out what would be involved in a systems approach to individualized instruction to take a look at the whole thing.

Q: Could this be done privately?

A: Yes this could be done privately. In fact, I would be hopeful that some of the more enterprising corporations could take it upon themselves to do this, particularly the ones who have been rapidly acquiring other little companies in publishing and systems development and so forth, that have specialized functions. I think they would have it within their capability to put together this kind of thing, at least to get us started, and to give us something to criticize."

A PRACTICAL PROGRAM FOR "REAL" LEARNING

The word "relevance" is one of the magic new words in education; everyone seems to agree that it is desirable. Relevance would seem to mean that the content of education has a readily apparent relationship to the functional life of the student, either in the present or the foreseeable future. If relevance is good, realism is better. Realism in education would mean the content resembles the functions of real life. Better still than realism would be reality, in which the content of education intertwines with the actual performance of real life, including vocational functions.

A combination of relevance and realism, as well as reality in its most immediate sense, underlies a program called Project FEAST (Food Education and Service Technology) which has been spreading rapidly in high schools of California and other western states. In nine high schools in the Bay Area, the program has been in operation for well over a year. Project FEAST trains students for what is called the "hospitality industry." It emphasizes the mass preparation and service of food: quantity cooking and baking, menu planning, waiter and waitress skills, sanitation, stores accounting and the fundamentals of nutrition. Also students have the opportunity to learn administrative and managerial skills of hotel operation: bookkeeping, operation of front desks, the work of head waiters, and so forth.

Although not designed specifically for potential dropouts, Project FEAST is keeping a substantial number of students in school who would otherwise be out on the street looking for jobs. More than that, Project FEAST appears to be involving these students in learning with a motivation that most of them had not previously experienced. FEAST consists of two years of both practical and academic work, as well as summer on-the-job experience for most students. Many hold after-school jobs in restaurants and drive-ins that enhance the relevance -- in fact, the reality -- of their school studies, not to mention the self-dependence and self-esteem that derive from earning money in a major industry.

Food service and hotels comprise America's fourth largest industry offering career openings for about 100,000 trained men and women each year. The industry has been suffering an extreme shortage of personnel in entry as well as middle-management jobs, an inviting fact that has not been lost upon applicants for the FEAST program. While the program started with an early intention of equipping educationally disadvantaged students in depressed areas for the job market, FEAST has spread to high schools in middle-class suburbs where it has attained considerable popularity and success.

Some of the theory behind FEAST is best explained by describing its genesis. Several years ago, teachers and administrators of a few Northern California schools, aided by funds from the Rosenberg and Ford Foundations, began a Pre-Engineering Technical Program, widely publicized as the Richmond Plan. Small, experimental numbers of bright but insufficiently-motivated students were given a special course of study to help them qualify for entrance into colleges and technical schools. Chiefly, the

two-year course aimed at ending the artificial fragmentation of studies in science, math, shop and English. Teachers in these subjects organized as teams, developing a highly integrated curriculum and gearing their daily classwork to each other's lessons. For example, if a science class was about to take up the theory of light, the math teacher would offer instruction in wave mathematics, the shop teacher would create a special project for practical experience with light such as making a pin-hole camera, and the English teacher might require a technical report on studies in the other classes. An extensive description of the operation of the Richmond Plan can be found in a booklet, "New Directions in Vocational Education" (available for 30 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, Catalog No. FS 5.280: 80047).

Later, the U. S. Office of Education commissioned the Stanford Research Institute to conduct a detailed study and evaluation of the Richmond Plan. The study, directed by Dr. Harry B. Kincaid, found a wide variation of results from school to school. In some schools, great beneficial change in attitude and academic achievement was found; far less in others. A major factor accompanying success or lack of it was found to be the quality of participation by teachers. The programs judged most successful were those in which teachers were most carefully prepared to implement the theory, most committed to a belief in the program, and sharing the most esprit de corps among team members. Thus, what is true of most innovations in teaching appears to be true of the Richmond Plan: it is as good as the teachers who conduct it.

In contrast, one of the more promising features of FEAST (which appears adaptable to vocational fields other than food preparation and hotel management) is that the nature of the content requires a far greater interaction by students with environmental learning materials. Even more appealing, the doing and learning is not only relevant and realistic, but real. When a student spends his morning baking a pie, the pie is likely to be served at noon in the school's cafetaria, dished out by one of the baker's classmates and eaten by his fellow students. This reality, joining study with visibly useful work, appears to have had a profoundly positive effect on the school attitudes and life attitudes of FEAST students.

For two hours a day, FEAST students work in a home economics laboratory on mass preparation of foods. For two remaining hours, they attend classes in business procedures (particularly typing and computation) and English (concentrating on menu preparation and letter writing), both courses highly geared to restaurant and hotel activities. Thus, as in the Richmond Pre-Tech Program, the content of several courses is carefully integrated. Beyond this four-hour grouping of FEAST courses, students are engaged in studying other electives that qualify them for high-school graduation. The 12th-grade students in their second year of the FEAST program may work at outside jobs during the second semester for two to four hours of school credit.

The school cafetaria manager is a member of the teaching team because much of the students' practical experience is gained in helping with school lunches. FEAST students in the home economics laboratory

regularly prepare at least one dish daily on the cafetaria menu. In addition, one-quarter of the class is normally absent from the lab to work in the cafetaria kitchen and at the serving tables.

At Oakland Technical High School, well over half of FEAST enrollment are boys. Whereas boys might ordinarily be embarrassed by being in a class related to home economics, they apparently feel great status in having been accepted for FEAST. Says Miss Shirley Odum, kitchen lab teacher:

"These boys usually don't want to go out of the room without wearing their aprons. They love to walk down the hall wearing them. If I say, 'I need someone to take something down to the cafetaria,' I have a hard time. They all want to go down. They want to be seen. Maybe the apron makes them feel more professional. Also, I have trouble with students coming to see what's going on in FEAST. Often I have to keep my door locked."

"You can always spot a FEAST student in the cafetaria," says Carl Larsson, special education teacher at Oakland. "He goes from table to table asking students -- usually close friends -- 'How'd you like the rolls?' or 'What did you think of the pie today?' Having friends judge his finished product is an added incentive to do a good job.

"Perhaps the best part of being in Project FEAST for some students is, as one of them said, 'Because you get to do big things.' For example, last year the students catered the banquet of the western regional conference of the National Restaurant Association. Some 200 restaurant owners and managers attended the banquet, and many went away visibly impressed with the way the students prepared and served the meal. As a matter of fact, a number of them have since recruited Project FEAST graduates to work

in their establishments.

"The students also cater their school's annual awards banquet and a number of civic functions, such as PTA dinners. The teachers try to stay in the background during these activities as much as possible. Through committees, the students plan the menu, design it, and arrange to have it printed. They elect a head chef, salad maker, dessert maker and head-waiter, and they requisition needed food and supplies."

"We're always working under pressure," says Miss Odum, "We always have a deadline for something. We have two events next week, a salad luncheon for the PTA and an anniversary dinner for the Boy Scouts. After that's the senior ball. The first time we had a dinner, I thought everything was just going to fall apart. But they really do come through unbelievably, better than a lot of adults would.

"Once we had a pie-crust sale and then began getting requests from faculty members for pies. The students, on their own, made up notices and distributed them in the teachers' cubby holes. We went down to a bakery-supply company and got aluminum tins and paper boxes. Then one of the students said, 'Hey, why don't we go around to the teachers and do the personal bit?' They ran around to the teachers' rooms and got orders. We sold the pies for fifty cents apiece and on the first day we made $32. They used the money to throw a big dinner for themselves. Those were all seniors. The juniors were here in the lab and I don't know why I even tried to teach them that day. They were much more interested in what the seniors were doing. Next day the seniors started doing demonstrations for the juniors. It was great for both of them.

"At one school, they have a FEAST Corporation. The students put in a dollar apiece at the beginning of the year. By the end of the year, they had something like $17 for each dollar invested. They started a fund for FEAST students going to college, awarding $100 scholarships.

"I teach one regular home economics class besides this. The difference is so real. In my home-ec class, the students are there because they have to be. They're just kind of blah. It just drains me. They're waiting for you to give them something. That's what most classes are, what most of school is. In this class, the students have a chance to give you something. They'll give you anything almost. They feel so much better and so do I. Young people are so eager to give -- to learn to give -- but school hardly ever gives them a chance to. The teacher is supposed to do all the giving and the kids sit there, most of the time not taking."

From these enthusiastic accounts, one might surmise that teachers are describing highly-charged students who would be successful in almost any setting. Quite the opposite is true. At Oakland Tech., the incidence of poverty is high. The school has a history of serious violent outbreaks. The dropout rate is discouraging. Those enrolled in FEAST are often students with the most severe educational difficulties. The change that comes about in FEAST classes is most evident in the business course conducted by Mrs. Ruth Smith. She reports:

"FEAST students get to know why they're learning. Seniors who go out to work come back and tell the others what they're going to have to know. Sometimes they even come back to the teachers and say, 'We should have more of this or more of that.' We had one boy working at the Sir Francis Drake Hotel typing menus every day and another in a stock room at another

hotel who had to type up menus. Still another's working at the Hilton typing up the guest register. They come back and tell the students that it's not all just cooking, that they have to be well-rounded. Besides typing, the students are working on adding machines and cash registers. They're really working at it because they know why."

Mrs. Smith tries to focus her typing drill on the preparation of thank-you letters following field trips and after the appearance of guest lecturers from industry, as well as on practice letters for job applications. Students seem to enjoy these realistic activities best, next to typing menus for school events. During such events students often approach teachers and parents, saying with obvious pride, "I typed that menu."

Students are often assigned to make telephone calls to managers of various enterprises to confirm arrangements for field trips. "This activity," says Mr. Larsson, "impresses the students with the need to speak clearly and accurately. Doing these things, many students acquire their first taste of adult responsibility. Some are pleasantly surprised to find that they can handle these situations. Almost none of them 'cop out' -- or drop out. Last year, we lost only one of the 56 students in the project."

A major ingredient of FEAST is the cooperation of the hotel and restaurant department of the City College of San Francisco. This cooperation takes two important forms. One is a special summer training course required for teachers before they may join a FEAST team. The other is the special gearing of college-level technical courses for FEAST graduates. As a result, a great number of students go to City

College who not only would have been unlikely to enter any college but would have been probable candidates for dropping out of high school.

In late 1967, Mrs. Hilda Watson Gifford, FEAST director, surveyed the post-high school experience of the first 36 students who had finished the FEAST course at Oakland. Of these, 17 were attending college. Eighteen were holding foods-related jobs, 13 of them attending college simultaneously (thus are also counted in the college figure). Four were employed in other industries and five were in military service. Five female students had married; of these, three were not seeking employment, one was employed, and one was both employed and attending college. Two males had dropped out during their junior year and were the only students not known to be employed.

The summer workshop for teachers conducted by the City College of San Francisco lasts four weeks. It is financed jointly by the Vocational Education Act of 1963 and the Center for Technological Education of San Francisco State College, which was established by the Ford Foundation. Each school's team is composed of teachers in homemaking, English and business-mathematics, as well as the cafetaria manager and a counselor. The workshop is conducted in two two-week phases:

PHASE I is spent in practical laboratory experience. Teams work three mornings at each of several "stations": 1) food preparation 2) baking 3) dining room service and storeroom operation. During these sessions, team members prepare and serve luncheon daily for 75-100 guests from industry and education. Afternoons are spent hearing guest speakers on practical aspects of operating hotels, restaurants, clubs, institutions,

school lunch programs and unions. In addition, a one-day field trip exposes the teachers to the hospitality industry, covering both the "front and back of the house" in hotels, restaurants and other food operations.

PHASE II is devoted to developing coordinated course outlines under the guidance of Dr. Mildred Barnard, a curriculum developer, and in using the Alice Statler Library of the City College.

The entire project is obviously strengthened by having English and business-mathematics teachers involved in the practical kitchen phases of the workshop, the better to integrate their subject matter. For the student, however, the real strength appears to be FEAST's dependence on a student's real work at least as much as on a teacher's teaching. A student who has rolled a pie crust, tossed a salad, typed a menu, performed the mathematics of computing ingredients for mass servings as well as costing out a menu, then serving a meal with skill and dignity, has had a learning experience and a work satisfaction that is not dependent on a teacher. The student is his own teaching machine. He has learned from his own hands, his own motivation, his own experience.

VOCATIONAL GUIDANCE: AN UNFULFILLED CHALLENGE

The preceding chapters have been on education -- on new ways for school youngsters to acquire real learning experiences -- for emerging occupations. The selected illustrations have emphasized education built upon experience -- "learning by doing" -- as against instruction, exhortation, display or other forms of attempted imparting of knowledge by adult to student. This is not to say that one method is suggested as a replacement for the other. It reflects, instead, a feeling held by a growing number of educators and researchers that one of these methods -- the instruction attitude -- has too heavily dominated our schools and lies at the root of much of the failure to prepare America's youngsters vocationally: a shift in emphasis to learning by experience is advocated.

Vocational preparation, however, is more than learning to do lessons better, even if the lessons are self-directed, manipulative and based on performance objectives. To choose a vocation and prepare for it, a youngster must know something about the array of occupations from which he may choose. He must know the names of jobs and what those names describe. He ought to know not only what a certain kind of worker does but the atmosphere he works in, the kinds of people he works with and how he relates to those people. He ought to know how he might advance from the job he first sets his mind to, and how he as a student may advance toward that job. What does he need to study? What kinds of jobs might he have to hold first? Suppose he should change his mind before or after

getting there. Is all his preparation wasted? In what other directions might he use his acquired skills and knowledges?

As a relatively inexperienced youngster, the student keeps hearing from every side how important it is for him to prepare, prepare, prepare, to make up his mind what he wants to be, to choose a career before it's too late. Ever since he was four years old, uncles and cousins and neighborhood friends have been asking good-naturedly, "What do you want to be when you grow up?" With each passing year the question becomes less good-natured and more anxious. How is he to know the answer? From what experience can he draw? Where can he get systematic advice and on what subjective basis may he judge the advice?

While the public-school system has largely denied the youngster an opportunity to acquire even simple kinds of practical work experience in the real (or even realistic) work world, it ostensibly offers a system for giving advice. It offers a student the services of a guidance counselor.

Many guidance counselors may take issue at being charged with this responsibility. While guidance professionals are all apparently devoted to helping chart the academic futures of their students, most do little to help chart a youngster's work future. The reason is succinctly stated in the report of the Advisory Council on Vocational Education:

"Most guidance personnel are oriented by past experience and by community pressures toward providing educational guidance for higher education. They know colleges and college requirements, but they do not know enough about employment outside the professions or about the

requirements for such employment."

The study by Kaufman et al on preparation of secondary-school youth for employment closely examined the work of guidance counselors in its sizable sampling of schools. Of the qualifications of these counselors, the report concluded:

"The major weakness noted was the general lack of occupational experience of a wage-earning type....There was evidence of a closer relationship between office occupations and guidance than in some of the other vocational areas....When considered in light of need, it is the vocational and not the academic or general-curriculum graduate who needs guidance the most....The uninitiated observer, upon considering these facts, would expect the major counseling effort in the schools to be directed towards helping the vocationally-oriented student to choose among possible occupational clusters that interest him. Anyone familiar with the operation of American high schools knows that the prevailing situation is just the opposite.

"Data from this study revealed that the vocational students were the least likely to have discussed either their course choices or their occupational plans with a guidance counselor."

That finding does not describe the worst of the situation. The real concern should be for the great majority in the middle and lower end of academic ranks who qualify for neither college nor vocational courses and who will soon be among the wage earners -- or among the unemployed. Concerning the neediest students in this majority group, the Kaufman report stated:

"Most large cities have felt a strong impact from minority populations and, in most instances, educators, especially at guidance levels, have reacted to this experience in a traditionally conservative manner. Apparently, instead of making sweeping changes to combat the situation effectively, they have tried to adjust their programs along known concepts -- concepts which do not generally apply to minority youth. Application of traditional principles of guidance to situations which demand a new mode of thinking have only complicated the racial situation."

Criticism of guidance counseling went beyond the general failure of counselors to understand or advise about the real world of jobs: "In fact, most of the counselors confessed that they were unacquainted with the excellent vocational offerings of the school system except for the information disseminated to them through regular communication channels."

Generally concurring in these criticisms, the Advisory Council on Vocational Education proposed the following:

"Two actions seem to us desirable: First, employment of guidance personnel who have experience and knowledge of the world of work and its requirements and integration of such personnel in the regular guidance staff to handle specific student problems and to reorient other guidance workers. Secondly, development of a systematic program which will enable the regular guidance staff to acquire knowledge of and experience in the world of work."

Realization of these two suggestions appears far off. The first would require great turnover of guidance personnel and possibly radical

change in certification requirements to enable the unlikely turnover. The second -- requiring guidance-staff members to acquire experience in the world of work -- would mean largely reorganizing the lives of tens of thousands of professionals who are likely to resist it.

The Kaufman report analyzes the problem differently:

"The most vital contribution counseling and guidance can make to vocational students is the fostering of attitudes of control [in the student] and providing information on the basis of which they can plan their vocational lives. Most middle-class children receive these attitudes through the socialization processes in their homes. The parents of vocationally undecided students, however, tend to have unstable employment patterns. Such parents do not always provide the necessary role models. They may feel the vagaries of their occupational lives are beyond their control, and they tend to pass on these attitudes to their children. Counseling could provide a different model, a problem-solving approach."

A practical example of counseling providing a different model, including a problem-solving approach, is not easily found. The Kaufman study refers to one unidentified example of a school which, despire poor physical facilities, was the best instance of realistic guidance that the investigators found. The value of this school's program, however, was attributed purely to the spirit of its guidance counselors -- a factor always commendable, but not readily described or applicable.

Another example is an experimental attempt by the public schools of Quincy, Massachusetts, involving junior-high school students in taking

inventory of their own abilities, knowledges and ambitions for their vocational futures. Counselors are equipped with such supplementary materials as kits of job descriptions, reference documents and audio-visual aids. This new system, which may soon be privately published, may prove to be an advancement over most existing guidance practice. Observed in its early stages, the system appeared to rely heavily on paper-and-pencil work by students and seemed to be treated by counselors as an additional form of homework. A true description and evaluation of the Quincy experiment would best be made in two or three years as new guidance personnel move into its operation and older personnel adjust to its requirements.

Clearly, the great need for creative invention, experimentation and research in the field of vocational guidance remains. The public schools of America face no greater test than in meeting this need.

If schools are to meet the test of realistic guidance counseling, they must begin to cast a steady eye upon the real world of occupations for college-bound and job-bound students alike. As long as guidance remains unrealistic, instruction is likely to remain mired in unreality.

On the other hand, a massive creative effort to bring real-world relevance to guidance (an effort which has not yet seriously begun) may produce the single most effective pressure toward the improvement of instruction.

Fulfillment of this most urgent of needs -- which will serve students, the institution of the public schools as well as the social and economic health of the nation at large -- deserves the attention of the best minds that schools and the general community are able to provide.

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